Safetran Systems Corporation

Instruction & Maintenance

Model S

Railroad Highway Crossing Gate

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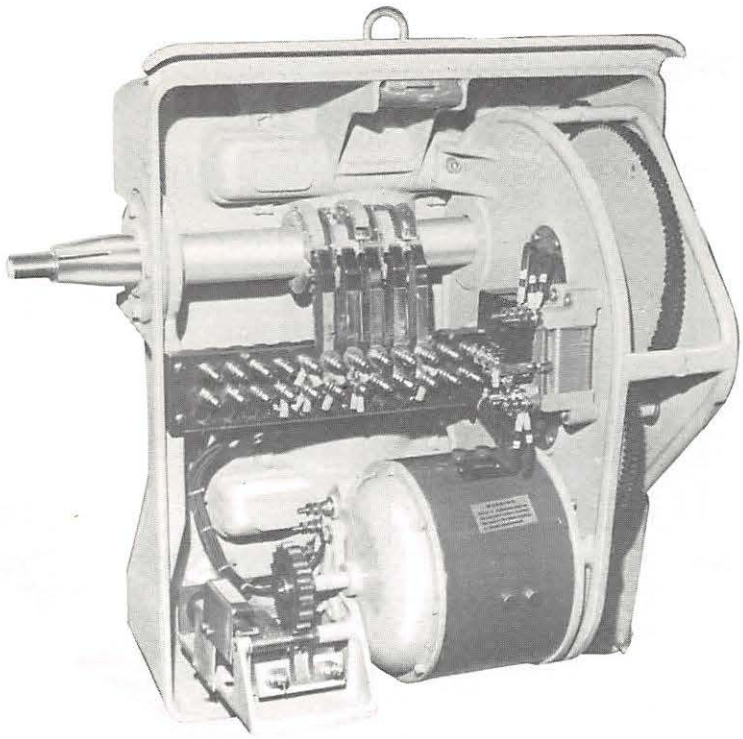
Model S Mast Mounted Gate



Introduction

The Model S Gate, serving the Railroad industry for over a quarter of a century, now has a cast aluminum housing. Steel gears mounted on ball bearing shafts provide a smooth running 240 to 1 reduction gear train. Sealed ball bearings on these shafts are factory lubricated and require no further maintenance.

The gear train is powered by a 12-volt motor designed and built for this mechanism to operate the longest, properly counterbalanced gate arms smoothly and rapidly-even when arms are covered with sleet. During motor-up cycle, current consumption is 6-15 amperes, with an applied voltage of not less than 11 volts at the motor terminals.

During the motor-down cycle, current consumption is 6-15 amperes with an applied voltage of not less than 11 volts at the motor terminals.

The hold clear device, mounted on the end of the motor shaft, is an over-running clutch which will latch the gate in the vertical position when the electro-magnet is energized.

Holding the gate arm in the vertical position requires 34 milliamps at 12 volts.

Adjustable circuit controller cams are mounted on the shaft. Contact springs are mounted on a terminal board, forward in the assembly for ease of adjustment, inspection and maintenance.

Cast aluminum gate arm supports are mounted on each end of the main shaft. They are adaptable for mounting of either wood or fiberglass gate arms.

Gate mechanism may be ordered with factory installed auxiliary shaft, for application of sidewalk arm where required.

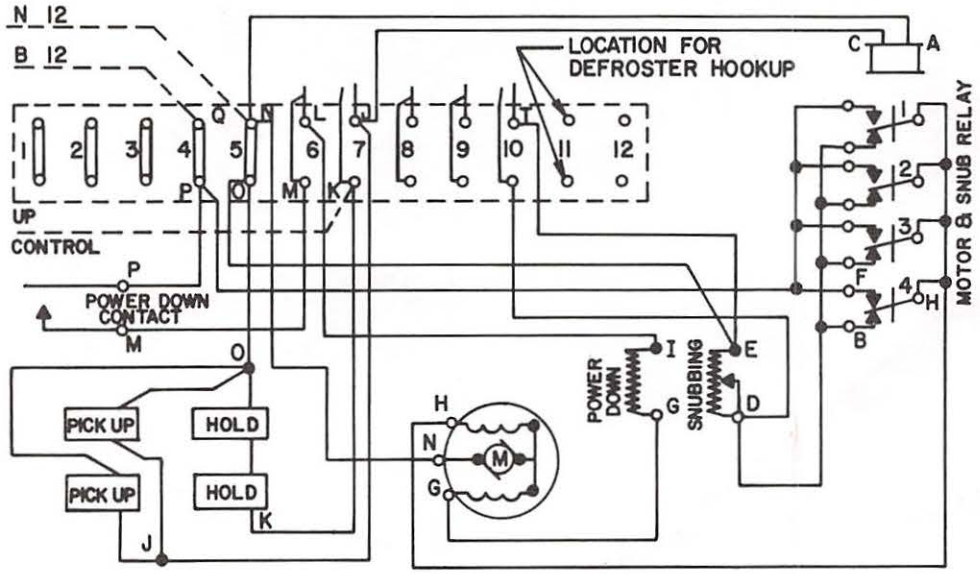
The cast cabinet is designed to mount directly on a five-inch mast, however, adapters can also be furnished for mounting on four- or eight-inch masts.

Serial numbers are located on the motor identification tag and on the vent protruding from the rear of the gate mechanism cabinet.

Model S Gate Wiring Diagram

(Shown with mechanism in vertical position)

CONTACTS CLOSED AT	FUNCTION
6. 45°-90°	POWER DOWN
7. 0°-89°	POWER UP
8. 83°-90°	FLASHING LIGHT (SPARE)
9. 5°-90°	BELL (SPARE)
10. 0°- 5°	HORIZONTAL SNUB



Recommended Battery and Wire Requirements

Sizes of wire used for the motor circuit should be calculated so that there will be not more than 0.1 ohm resistance between the battery and mechanism terminals.

Wire sizes as follows are recommended:

Distance from Battery Terminals to Mechanism Terminals	Size of Soft Drawn Copper Wire to Use
Up to 60 feet (120 feet of wire)	No. 9 AWG
From 60 to 120 feet (240 feet of wire)	No. 6 AWG

The following battery is recommended with above wire sizes for gates of various lengths:

Gate Arm Length in Feet	Number of Cells		
	Lead	Nickel Iron	Nickel Cadmium
Up to 24	6	9	9
25 to 42	7	11	11

Defrosters

Ordering Information

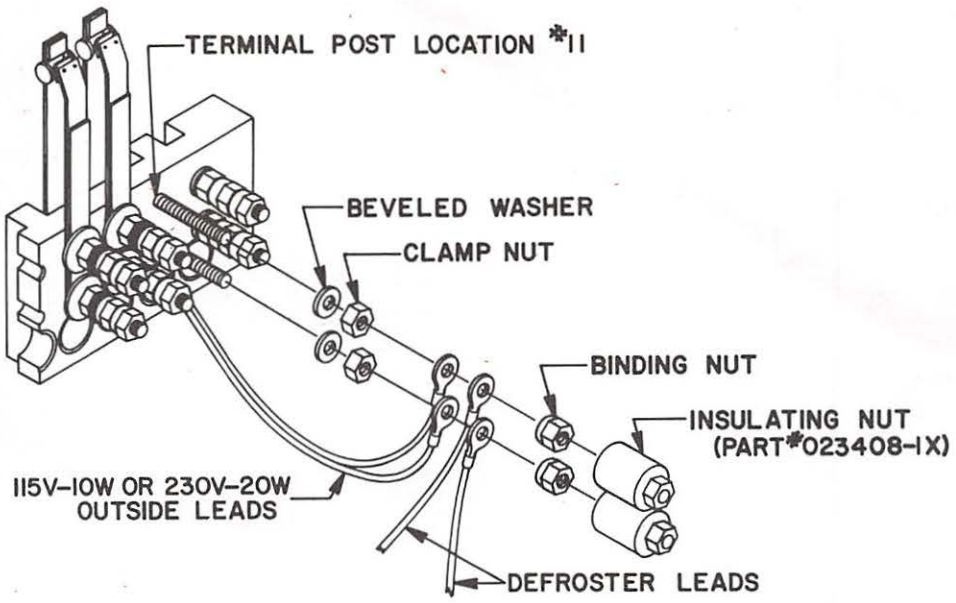
When planning installations in areas where frost accumulation on mechanism contacts might be expected, thought should be given to providing 2 wires in cable to permit operation of defroster.

Defroster (115 VAC Operation) Part # 070698-4X
Defroster (230 VAC Operation) Part # 070698-5X

Installation

Using contact terminal posts at position II on terminal board (see wiring diagram, page 2), connect the two terminal rings as shown in illustration below. Position the heating element directly under the commutator and brushes, located on the bottom side of the motor toward the operating end. Wrap the remaining wire around the outside circumference of the motor end. Attach the wire to the motor end cover with clips provided.

WARNING: Observe caution in handling 115/230 VAC primary connections. Make initial primary connections with power off.



Foundations

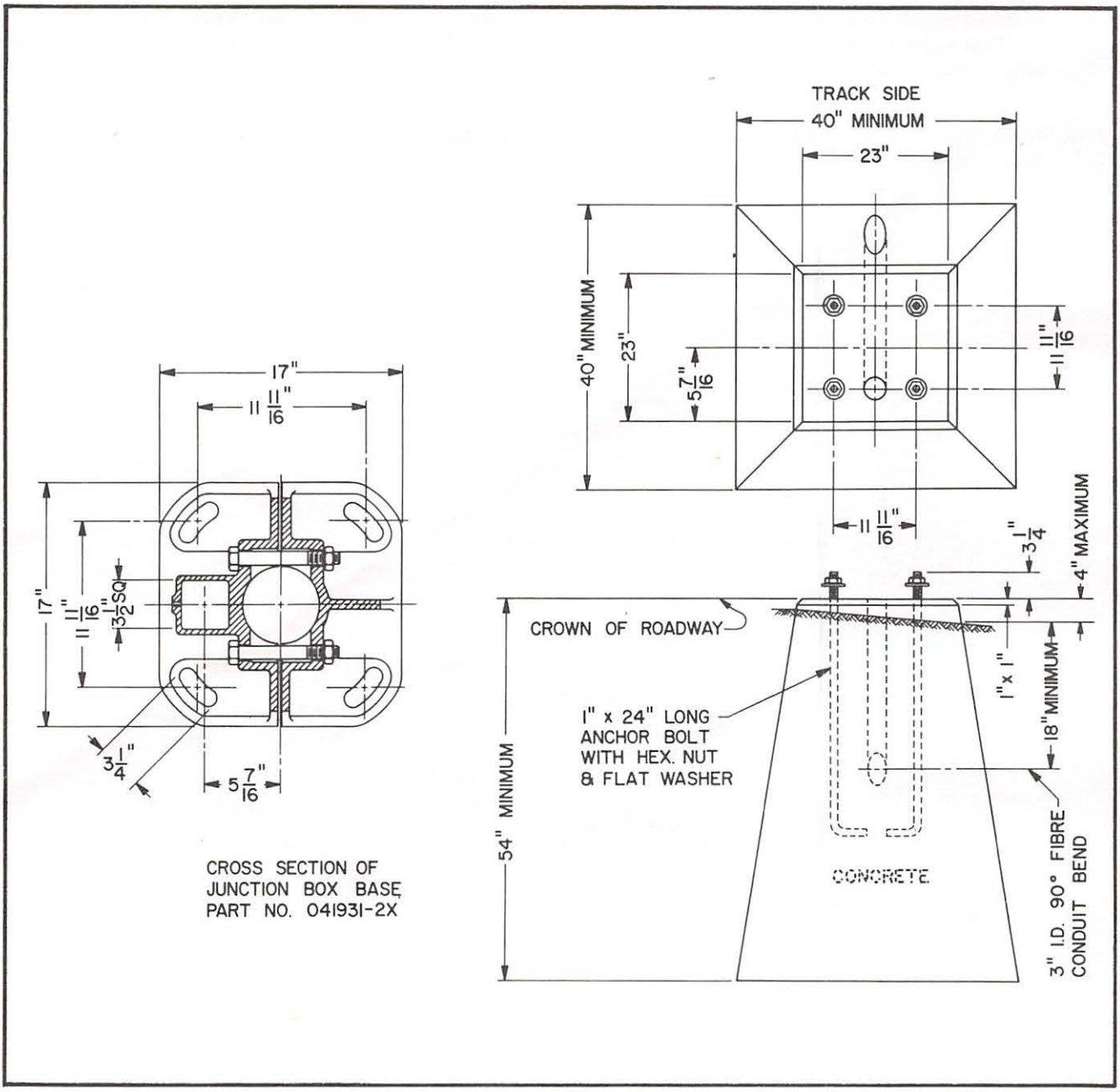
Galvanized steel prefabricated or poured concrete may be used for the foundation.

When using Safetran's galvanized steel foundation, Part Number 035903-911-1X, be sure bottom of excavation is flat and level to insure full support to the base plate. Backfill shall be compacted, with height of exposure above ground as shown for concrete below.

Place foundation as dictated by local conditions, remembering that gate arm lengths are measured from center of foundation to end of arm.

For field poured concrete foundation, 4 anchor bolts, Part Number 131702-5X, are required.

The recommended size of concrete foundation is shown in drawing below.



CROSS SECTION OF
JUNCTION BOX BASE
PART NO. 041931-2X

Installation

1. Erect five-inch mast, with junction box on base facing traffic. Mounting hole for normal front and/or back flashing lights will be on the field side of mast.
2. Thread flex conduit coupling into top of junction box base, and 90° coupling into back of gate cabinet.
3. Mount mechanism support clamp assembly, Part Number 070786-5X, on mast with casting facing 45° from field side toward track. Top of casting should be placed 51" above top of foundation.
4. Insert four (4) slot nuts, Part Number 070950-1, in back of cabinet. (See page 16, item number 20.)
5. Set gate mechanism on top of support clamp assembly, fasten to mast with clamps, Part Number 070950, and bolts provided. (See page 16, item number 10.)
6. Install cast aluminum gate arm supports which have mounting hubs bolted in place. Locate on keyed main shaft loosely, do not tighten nuts on main shaft securely until gate arm coupling has been bolted in place.
7. Bolt bendable coupling (for wood gate arms) or conversion bracket (for Fiberglass or Fiberglass/Aluminum Gate Arms) in place securely.
8. Tighten nuts on ends of main shaft.
9. Install flex conduit from rear of gate housing to coupling on top of junction box base.
10. Mount flashing lights on main mast. The flashing light units have been factory wired into their junction box, control wires from the junction box to junction box base must be field installed. When crossing is placed in service align lamps to provide maximum indication for approaching vehicles.
11. Bell, when used, is mounted on top of mast with gong facing roadway. A spare contact is provided on the controller to cut-off bell when gate arm is down. (See wiring diagram, page 2).
12. Mount required signs with hardware furnished.
13. Swing gate mechanism parallel to roadway, mount gate arm with gate arm lamps installed and wired. For safety, the gate arm should be held in horizontal position while applying counterweights. Counterweights furnished in accordance with table listings on page 11 are based on fiberglass or wood arms as manufactured by Safetran. Weights for other gate arms may vary due to construction and/or materials used.
14. Adjust descending time by adjustment of resistor ED. To cause gate arm to lower faster, increase resistance. (See wiring diagram, page 2).
15. Follow set-up adjustment card furnished with each gate mechanism.

Recommended Clearing Time	
Gate Arm Length in feet	**Clearing Time in seconds**
Up to 24	6
25 to 36	6 to 8
37 to 40	8 to 10

General Maintenance

Current S gate mechanisms have self-lubricating bearings on the main shaft but some older models require greasing bearings on main shaft. Also grease auxiliary sidewalk shaft bearings if gate is so equipped, with a multi-viscosity grease, such as Texaco "Low Temp, Grease EP".

Coat gears with a thin film of grease, such as Graphite Gredag, Grade 32.

The above should be done on a 3 to 6 month interval depending on number of gate operations.

Motor

The armature shaft is equipped with ball bearings packed at the factory with a special all weather grease. The bearings are sealed and lubrication of the motor is not required. The brush pressure should be between 8 to 10 ounces. Excessive pressure may result in brushes wearing too rapidly, while lack of pressure will result in arcing of the brushes, together with loss of power and excessive carbon deposits on the motor commutator. Lack of sufficient brush pressure may also result in failure of the gate to raise if weather conditions have caused frost to accumulate on the commutator surface. Normally the brush pressure, as adjusted at the factory, will be retained within proper limits throughout the long life of the brushes.

Other than an occasional check of the brush pressure, the only maintenance required is cleaning the commutator with a lint free cloth if it has become blackened by carbon deposits from the brushes.

Motor and Snub Relay

The motor and snub relay, bolted to the side of the large gear plate, has four front and back contacts, connected in parallel. Removable plastic cover allows for contact inspection. During clearing of the gate the relay is energized with front contacts closed to complete the motor up circuit. Relay is de-energized when contact number two at terminal board position #7 on the controller opens. With back contacts closed, it controls the snubbing on descent of the gate.

Field adjustments of this relay are not recommended. Relays failing to pick-up at nine volts should be replaced. The replacement number for the new relay is 070941-2X.

Hold Clear Ratchet

Mechanisms shipped from our factories after November 1, 1978 contain a new type factory lubricated hold clear ratchet assembly, Part Number 070658-8X. This ratchet is packed at the factory with a special all-weather grease and no further lubrication should be required.

Hold Clear Adjustments

The "Hold Clear" function is to hold the arm in a vertical position with power applied, but allowing the arm to descend when power is removed. This is achieved by an over-running clutch with an outer serrated ring, which is latched by an electro-magnetically operated roller and lever while energy is maintained on the coils.

Four coils are used in the electro-magnet. The two hold clear coils are wired in series for a total resistance of 356 ohms. The two pick-up coils have a resistance of 12.5 ohms each, connected in parallel to achieve a 6.25 ohm resistance. The hold clear armature is factory adjusted to release with a full load (gate vertical) at approximately 4.0 volts. Allowable tolerance on this release is from 4.0 to 6.4 volts and shall be readjusted when the full load release drops below 4.0 volts. Maximum pick-up is 7.0 volts.

The release is adjusted by increasing or decreasing the spring tension on the armature. Tighten nuts to increase drop away, loosen to decrease. Cotter pins must be replaced after adjustments. All moving parts should have appreciable end play in their respective supports. When the hold clear is released, the gap between the roller in the armature assembly and the serrated ring should not be less than 1/32". With hold clear energized there should be a clearance of .010"/.020" between the roller and the bottom of the notch in the serrated ring.

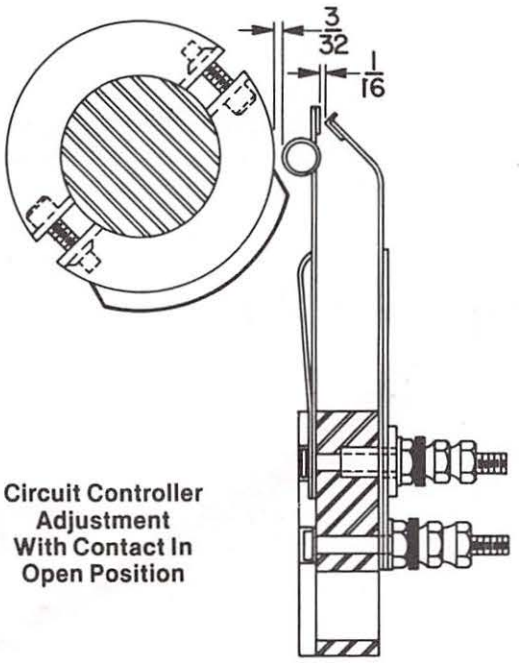
The power down contact is mounted on the hold clear assembly, and is actuated by movement of the armature. With the armature de-energized there should be a clearance of .015"/.020" between the end of the contact spring and the actuator. Contact spring pressure should be 100 grams. When energized, contact opening should be .050" minimum.

Circuit Controller Adjustment

Five spring contacts are normally provided on each assembly. There is space available to add two additional contacts if necessary. Three are required for regular operation of gate mechanism. Contacts 8 and 9 are spare, these are factory adjusted and may be used as indicated in the table below.

When contact is in the open position, adjustment can be maintained between cams on the main shaft and operating block as per drawing below.

Where adjustment becomes necessary, such as cam #2 at terminal board position #7 to control the vertical position of the arm, loosen screw with allen wrench. With wrench in screw socket, use as lever to shift cam position, then tighten screw.



Circuit Controller Adjustment With Contact In Open Position

Term. Board Position Number	Wire Designation	Contact Closed At	Function of Contact
6	L-M	45°-90°	Power Down Control
7	J-K	0°-89°	Power Up Control
8	R-S	83°-90°	Spare (Suggest Flashing Light Control)
9	V-W	5°-90°	Spare (Suggest Bell Control)
10	T-U	0°- 5°	Horizontal Snub Control

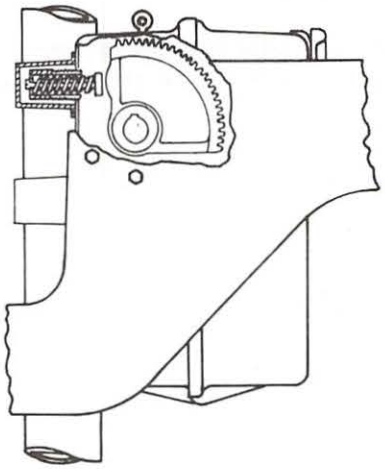
Spring Buffer Adjustment

The Model S gate mechanism is equipped with an adjustable spring buffer for horizontal and vertical gate arm positioning. They are factory adjusted; however, if field adjustment is necessary, follow instructions below.

Horizontal Position

The horizontal buffer controls the height of gate arm above the highway.

To adjust horizontal position; remove cap from rear of housing, loosen lock nut, turn threaded sleeve to raise or lower arm as required. Retighten lock nut and replace cap.



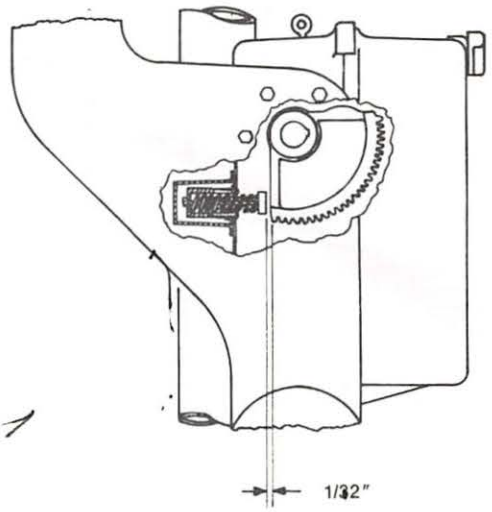
Vertical Position

Factory adjustment provides 1/32″ clearance between the buffer pad and segment gear, based on arm at full 90° position. If gate arm is to be positioned at less than 90°, the vertical buffer should be readjusted at time of installation.

To adjust, remove lower cover cap from the rear of the gate cabinet, loosen lock nut and adjust threaded sleeve until contact with the segment gear is obtained. Backing off sleeve approximately 1/3 turn will provide 1/32″ clearance.

After adjusting, secure lock nut and replace cap.

Note: This adjustment should always be checked before placing gate in service.



Installation of Steel Counterweights

Install Steel Counterweights as follows:

1. With gate arm mounted in the horizontal position, install the counterweight stud assembly (Item 4, page 22) on support gate arm using two counterweight bolt ratchets (Item 8, page 22) and two each: ¾" wrought washers, ¾" spring lock washers, and ¾" hex nuts.

2. Place proper amount of steel counterweights on plate stud assembly.

   The number of counterweights required (and other mounting materials) is determined by the type and length of gate arm used. (See tables 1 and 2 on page 11.)

NOTE: Counterweights for fiberglass arms up to 32' and wood arms up to 25' are mounted on one counterweight support arm.

Counterweight Requirements

	Gate Arm Length in Feet	Counter-Weights Required	Stud Plate Assy. 070757	Distance "X" in Feet	Scale Reading Range (lbs.)		Torque Range (ft.-lbs.)	
					Min.	Max.	Min.	Max.
Counter-weights mounted on one Support Arm	12'-16'	1	-26X	5'	35	37	175	185
	17'-20'	2	-26X	5'	35	37	175	185
	21'-24'	3	-26X	5'	35	37	175	185
	25'-26'	4	-26X	5'	38	42	190	210
	27'-28'	4	-26X	6'	36	39	215	235
	29'-30'	5	-26X	6'	40	44	240	260
	31'-32'	5	-26X	7'	38	41	265	285

Table 1 — Fiberglass Gate Arm Vertical Torque

	Gate Arm Length in Feet	Counter-Weights Required	Stud Plate Assy. 070757	Distance "X" in Feet	Scale Reading Range (lbs.)		Torque Range (ft.-lbs.)	
					Min.	Max.	Min.	Max.
Counter-weights mounted on one Support Arm	13'-18'	2	-26X	5'	35	37	175	185
	19'-24'	4	-26X	5'	35	37	175	185
Counter-weights mounted on two Support Arms	25'-26'	7	-26X	5'	38	42	190	210
	27'-28'	7	-26X	5'	43	47	215	235
	29'-30'	7	-26X	6'	40	44	240	260
	31'-32'	10	-26X	7'	38	41	265	285
	33'-34'	10	-26X	7'	41	44	290	310
	35'-36'	10	-26X	8'	40	42	315	335
	37'-38'	16	-24X	9'	38	40	340	360
	39'-40'	16	-24X	10'	36	38	365	385
	41'-42'	16	-24X	10'	39	40	390	400

Table 2 — Wood Gate Arm Vertical Torque

Note: All arms 31 feet and longer are shipped with a truss assembly.

Torque Adjustments
(Using Safetran Torque Wrench Kit)

Safetran's Torque Wrench Kit permits measurements to be taken from the 1/2 inch hexagon end of the motor shaft. It provides a simpler method than the conventional manner with a spring scale for both measurements.

The torque wrench is calibrated to allow for both inch-pound and foot-pound readings to be taken through the 240 to 1 gear reduction from the 1/2 inch hexagon end of the motor shaft. Other torque wrenches should not be used.

The torque adapter, included in the torque wrench kit, provides for torque adjustments to be made on older model gates. The adapter consists of a hex shaft made onto a collar which fits over the end of the motor pinion, and is held in place by a set screw.

The Safetran Torque Wrench Kit, Part Number 070981-X, consists of:

- Torque Wrench (calibrated for both inch-pound and foot-pound readings through the 240 to 1 gear reduction)
- Ratchet Wrench (3/8 inch drive)
- Ratcheting Box End Wrench (1/2 and 9/16 inch openings)
- Socket (1/2 inch, 3/8 inch drive)
- Torque Adapter
- Hex Key Wrench (3/16 inch)
- Tool Box

Horizontal Torque

1. To obtain horizontal torque, disconnect power to the gate and allow arm to lower to the horizontal position.
2. Lift the gate arm approximately 5 degrees from the horizontal position.
3. Attach the torque wrench to the hexagon end of the motor shaft and allow wrench to rotate until blocked by housing.
4. The value read should be between 50 and 100 foot-pounds. If reading does not fall in this range, counterweights should be moved in either direction, as shown on page 13 of this manual, until proper reading is obtained. Remove torque wrench before adjusting counterweights.
5. When proper reading is obtained, remove torque wrench and reapply power.

Vertical Torque

1. To obtain vertical torque, operate the gate mechanism to place the arm in the vertical position.
2. Place the torque wrench over the motor shaft with wrench as far clockwise and as far toward motor as possible.
3. Holding the torque wrench firmly, disconnect power-up and power-down circuits. Slowly allow wrench to rotate until blocked by casting. Make certain that the gate arm is not resting against the vertical spring buffer pad.
4. The value read should be in accordance with the torque range specifications as listed in tables on page 11 of this manual for the proper length gate arm.
5. If reading does not fall within specifications, counterweights should be moved horizontally in either direction, as shown on page 13 of this manual, until proper reading is obtained. Remove torque wrench before adjusting counterweights. When proper reading is obtained, remove wrench and reapply power.

Hand Cranking of Gate Mechanism

Warning: Disconnect power to gate mechanism before inserting tools for hand cranking.

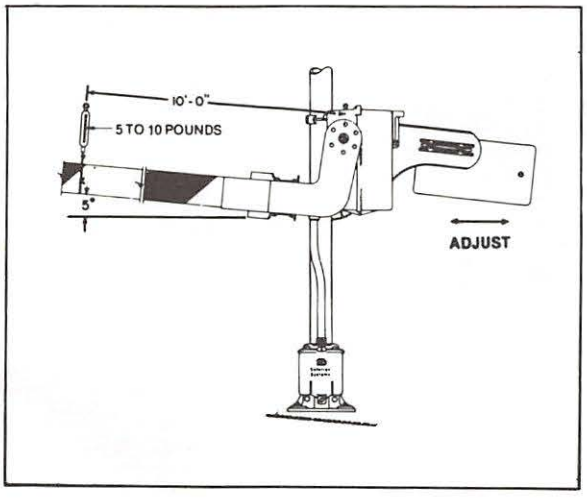
The gate mechanism hand crank feature may be used either to crank the gate arm up, or in the case where the arm has been sheared off, to crank the counterweights to the horizontal position. The tools required are a ratchet wrench with 3/8 inch square drive, a 1/2 inch socket for 3/8 inch drive, and a ratcheting box end wrench for 1/2 inch hex shaft; all of which are included in the Safetran Torque Wrench Kit.

1. Place ratcheting box end wrench over the hexagon shaft and slide towards motor. The ratchet should be set in the direction to prevent its rotation backward.
2. Place the ratchet wrench over the end of the hexagon shaft and crank in the desired direction. The mechanism may be held in the desired position by the ratchet wrench.

Torque Adjustments (Using Spring Scale)

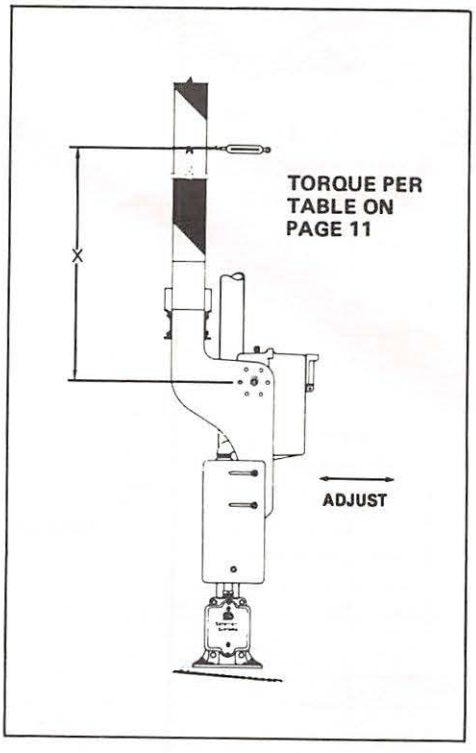
Horizontal Torque

With counterweights properly mounted on Gate Arm Support(s), adjust counterweights for proper horizontal torque as shown below. Horizontal torque should be at least 50 foot-pounds and not more than 100 foot-pounds.



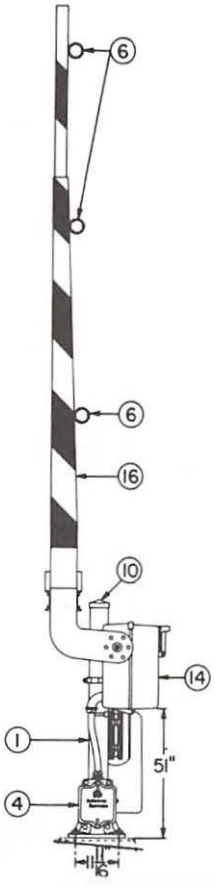
Vertical Torque

Allow gate to clear and latch. Attach spring scale as shown at right. Open power down and power up circuits by disconnecting battery to mechanism or by blocking controller contacts, allowing gate to fall (about 5°) against scale. Adjust counterweights for proper vertical torque. Torque values will vary with length of arm. Use tables 1 or 2 to determine proper torque value and measuring point on gate arm. Adjust counterweights for proper scale reading.

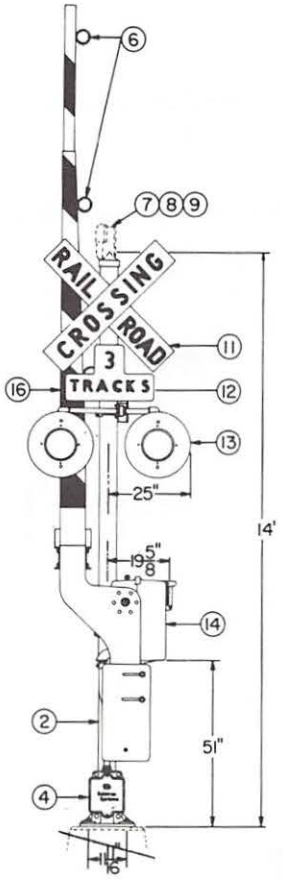


NOTE: Voltage on gate motor during up cycle should not be less than 11.0 volts nor more than 16.0 volts measured at motor terminals. If voltage exceeds 16.0 volts, it is possible gate will over drive and not latch at the clear position.

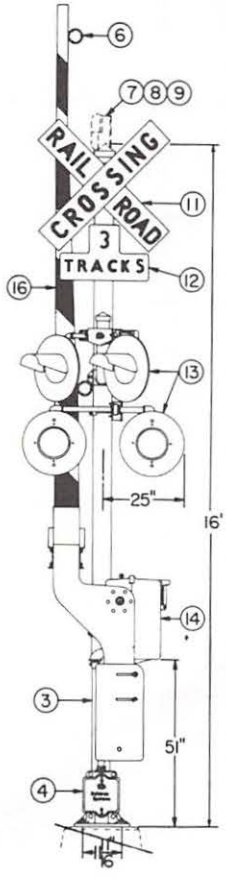
Model S Gate Types 50, 51, and 52 Replacement Parts

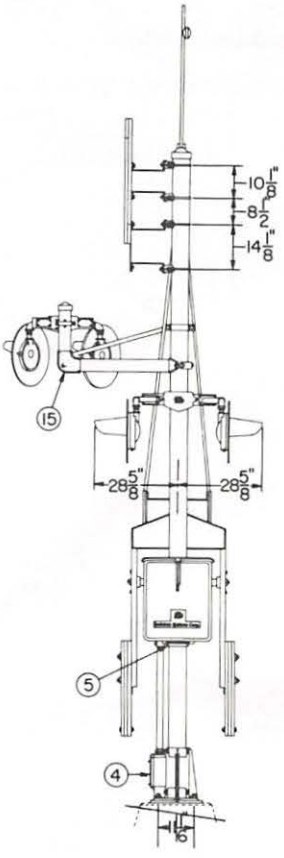


Type 50
S gate mounted on stub mast



Type 51
S gate with front and/or back flashing lights.



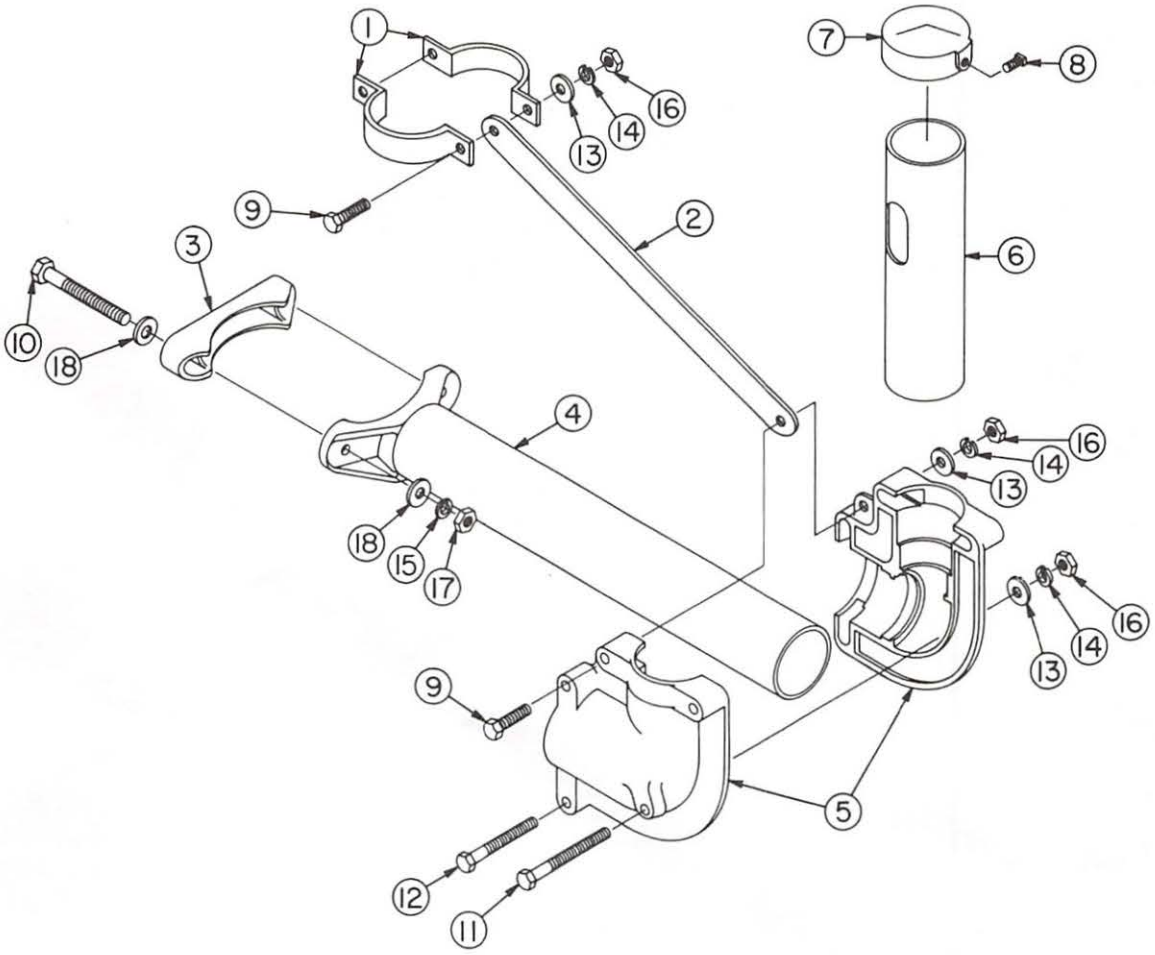


Type 52
S gate with front and/or back flashing lights and cantilever mounted sidelights.

To Order: Specify Description and Part Number.

Item Number	Description	Part Number
1	Mast, 5" Stub	070519-3A
2	Mast, 5" Standard	070519-27A
3	Mast, 5", for Front, Back, and 45° Left Lights	070519-44A
4	Base, Junction Box, 11-11/16" Bolt Spacing for 5" Pipe	041931-2X
5	Clamp, Mechanism Support	070786-5X
6	Lamp, Gate Arm	075950-500X
7	Bell, 8-12 VDC Operation, for 5" Mounting	040200-4X
8	Bell, 120 VAC Operation, for 5" Mounting	040200-8X
9	Bell, 12-16 VAC/10-12 VDC Operation, for 5" Mounting	040200-10X
10	Pinnacle, 5"	035045-503X
11	Sign, Railroad Crossing, for 5" Mounting	035200-17X
12	Sign, Track, for 5" Mounting, (specify # of tracks)	035235-(#)X
13	Lamp, Flashing — See flashing lamp section of catalog.	Specified
14	Mechanism, S Gate	070900-12X
15	Cantilever, Sidelight (Required for left hand sidelights)	041442-26X
16	Arm, Gate — See gate arm section of catalog.	Specified

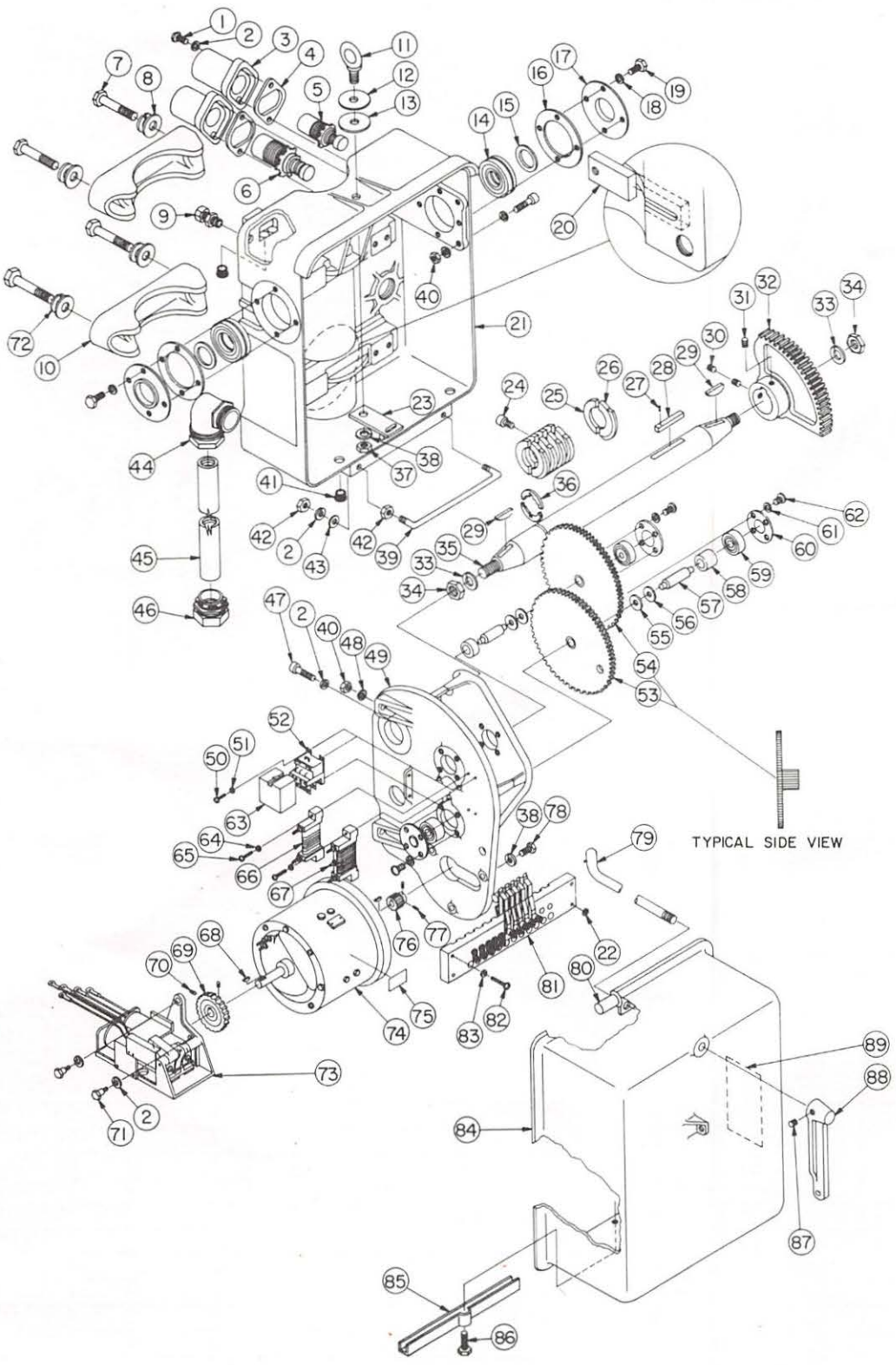
Sidelight Cantilever
Assembly and Replacement Parts



For Complete Assembly, Order Number 041442-26X

To Order: Specify Description and Part Number.

Item Number	Description	Quantity Required	Part Number
1	Clamp, Pipe, 5"	2	035015-A
2	Bar, Support	1	041442-30
3	Casting, Aluminum Clamp	1	070950
4	Pipe, Lower	1	041442-25X
5	Casting, Aluminum Elbow	2	041442-26
6	Pipe, Upper	1	041442-29
7	Pinnacle, 4"-5"	1	035045-502
8	Set Screw, Square Head, 3/8"- 16 x 1"	1	4932-SC
9	Cap Screw, Hex Head, 1/2"-13 x 2"	3	4170-HSC
10	Cap Screw, Hex Head, 3/4"-10 x 6"	2	4286-HSC
11	Cap Screw, Hex Head, 1/2"-13 x 6"	1	4182-HSC
12	Cap Screw, Hex Head, 1/2"-13 x 5"	4	4180-HSC
13	Washer, Wrought, 1/2"	8	1755-C
14	Washer, Spring Lock, M, 1/2"	8	1812-MSC
15	Washer, Spring Lock, M, 3/4"	8	1815-MSC
16	Nut, Hex, 1/2"-13	8	2108-SC
17	Nut, Hex, 3/4"-10	2	2114-SC
18	Washer, Flat, 3/4"	4	1737-SC

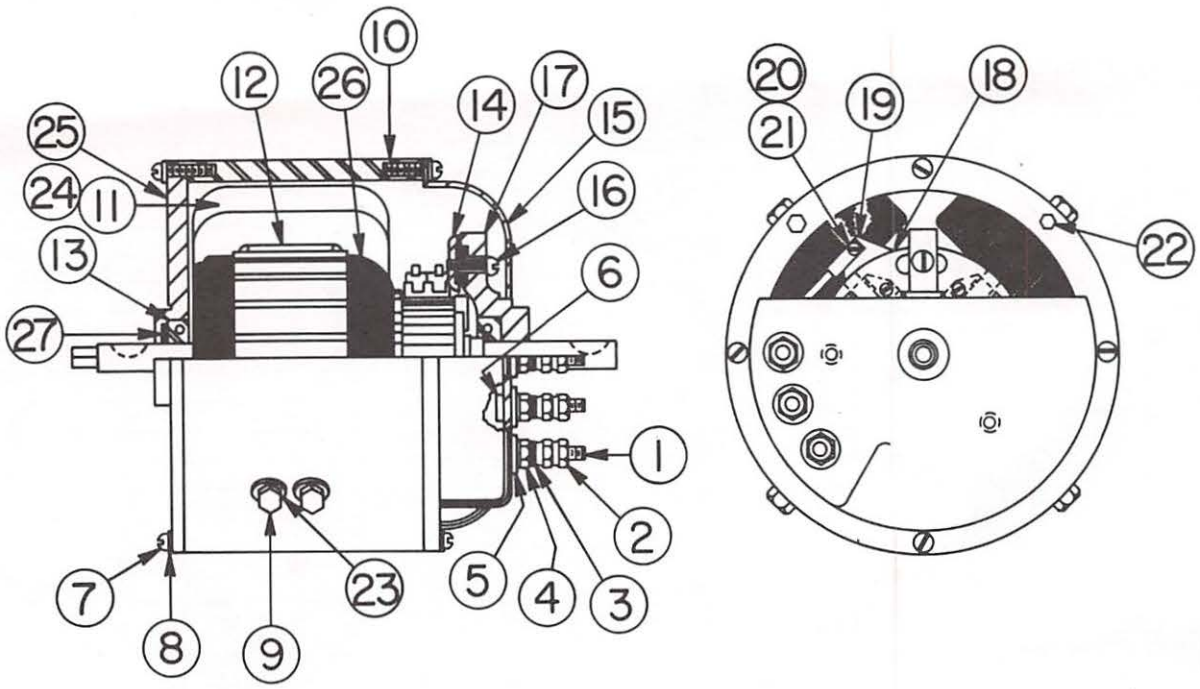

TYPICAL SIDE VIEW

Model S Gate Mechanism Assembly and Replacement Parts

To Order: Specify Description and Part Number.

Item No.	Description	Qty. Req.'d	Part No.
1	Cap Screw, Hex Head, 3/8"-16x1.25"	4	4089-HSC
2	Washer, Spring Lock, M, 3/8"	22	1810-MSC
3	Casting, Buffer Cap	2	070902-1
4	Gasket, Buffer Cap	2	070926-1
5	Buffer, Top Assembly	1	070903-X
6	Buffer, Bottom Assembly	1	070903-2X
7	Cap Screw, Hex Head, 3/4"-10 x 6"	4	4286-HSC
8	Washer, Wrought, 3/4"	4	1758-C
9	Connector, Relief, 3/4"	1	7354
10	Casting, Aluminum Saddle	2	070950
11	Bolt, Eye, 1/2" x 1.5	1	7099
12	Washer, Wrought, 1/2"	1	1755-SC
13	Washer, Sealing	1	070980-4
14	Bearing, Roller	2	070587-A
15	O-Ring, 2"	2	070585
16	Gasket, Seal Plate	2	070747-3
17	Casting, Aluminum Plate	2	070544-3
18	Washer, Spring Lock, M, 5/16"	8	1809-MSC
19	Cap Screw, Hex Head, 5/16"-18 x .75"	8	4044-HSC
20	Nut, Slot	4	070950-1
21	Housing, Gate	1	070900-13
22	Washer, Lock, I, 1/4"	2	1858-ISN
23	Plate, Latch Assembly	1	070919-3X
24	Cap Screw, Socket Head, 1/4"-20 x .875"	10	4003-SSC
25	Bracket, Cam	5	070633-A
26	Cam, Contact Assembly	5	070633-2X
27	Pin, Dowel, 1/4" x 1"	1	1123-S
28	Key	1	070547
29	Key, Woodruff, #UX	2	7149
30	Set Screw, Socket Head, 1/2"-13 x .375"	2	4704-SC
31	Set Screw, Socket Head, 1/2"-13 x .50"	1	4706-SC
32	Gear, Main Segment	1	070545-2
33	Washer, Spring Lock, M, 1"	2	1817-MSC
34	Nut, Hex, 1" - 14	2	2119-SC
35	Shaft, Main	1	070543
36	Ring, Retaining	2	070584
37	Nut, Hex, 1/2"-13	1	2108-SC
38	Washer, Spring Lock, M, 1/2"	4	1812-MSC
39	Bolt, Hinge	1	070968-2
40	Nut, Hex, 3/8"-16	6	2154-SC
41	Bushing, Vent	4	041913-X
42	Nut, Hex, 3/8"-16	4	2104-SC
43	Washer, Wrought, 3/8"	2	1753-C
44	Connector, Elbow	1	070232
45	Conduit, Flexible	1	070692
46	Connector, Straight	1	070233
47	Cap Screw, Socket Head, 3/8"-16 x 1.75"	6	4091-SSC
48	Washer, Shakeproof Lock, E, 3/8"	6	1860-ESC
49	Housing, Gear	1	070910-2
50	Machine Screw, Round Head, #8-32 x .375"	3	2572-RSC
51	Washer, Spring Lock, M, #8	3	1805-MSC
52	Relay, Gate Assembly	1	070941-X
53	Gear, Gate	1	070548-BX
54	Gear, Gate	1	070548-2X
55	Spacer, Tube	2	070550-2
56	Shim, Spring	2	070695-500X
57	Shaft, Gear	2	070550-1
58	Spacer, Tube	2	070550-3
59	Bearing	4	070588
60	Cover, Bearing	4	070553-A
61	Washer, Spring Lock, M, #10	20	1806-MSC
62	Machine Screw, Pan Head, #10-32 x .375"	16	2614-PSC
63	Cover, Relay	1	070941-1
64	Washer, Flat, #10	4	1712-SC
65	Machine Screw, Round Head, #10-32 x 1.50"	4	2624-RSC
66	Resistor, Fixed	1	029604-11X
67	Resistor, Adjustable	1	029602-4BX
68	Key, Woodruff, #10	2	7101
69	Ratchet, Hold Clear	1	070658-8X
70	Set Screw, Socket Head, 1/4"-28 x .25"	2	4615-SC
71	Bolt, Mounting	2	075084
72	Washer, Spring Lock, M, 3/4"	4	1815-MSC
73	Hold Clear Assembly	1	070780-AX
74	Motor Assembly	1	070640-3DX
75	Label, Warning	1	070980-2
76	Pinion, Motor	1	070554-A
77	Set Screw, Socket Head, 1/4"-28 x .25"	2	4615-SC
78	Cap Screw, Hex Head, 1/2"-13 x 1.25"	3	4167-HSC
79	Rod, Latch	1	070919-2
80	Gasket	1	070559-A
81	Board, Terminal Assy.	1	070625-6X
82	Machine Screw, Round Head, 1/4"-20 x 1.50"	4	2665-RSC
83	Washer, Spring Lock, M, 1/4"	2	1808-MSC
84	Cover, Cabinet Assembly	1	070901-2X
85	Retainer, Hinge	1	070968-4
86	Machine Screw, Slotted Hex Head, 5/16"-18 x 2.5"	1	2692-HSC
87	Set Screw, Socket Head, 3/8"-16 x .50"	1	7860-SC
88	Handle, Lock Latch	1	070909-4
89	Decal, Wiring	1	070976

Motor
Assembly and Replacement Parts

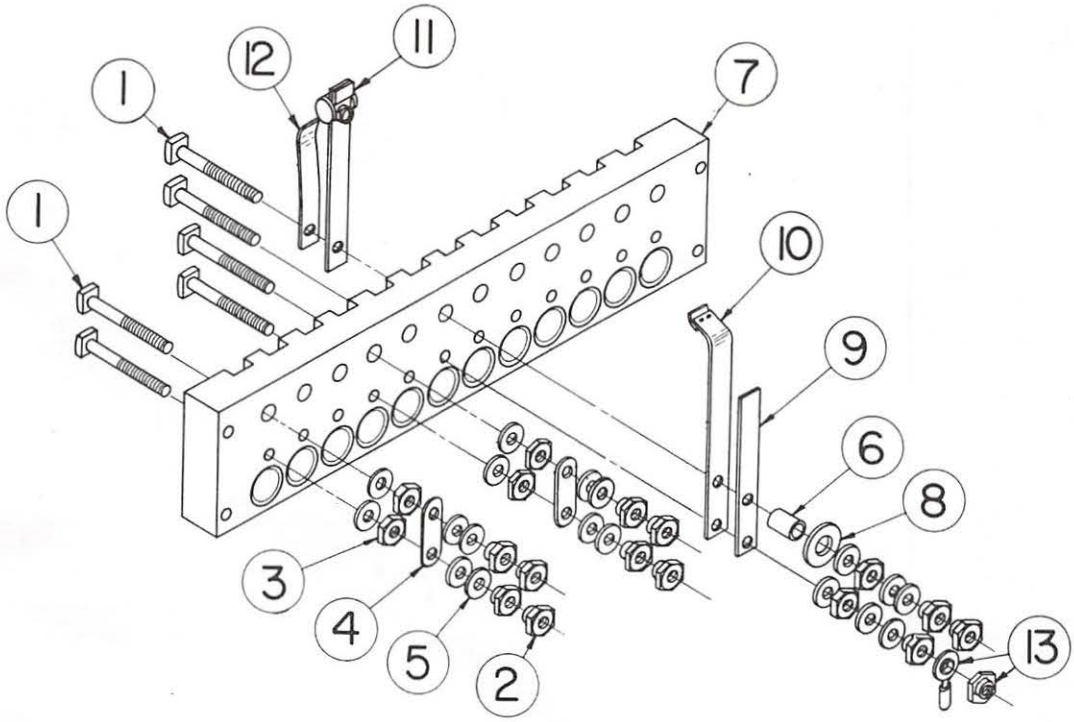


For Complete Assembly, Order Number 070640-3DX.

To Order: Specify Description and Part Number.

Item No.	Description	Qty. Req.'d.	Part No.	Item No.	Description	Qty. Req.'d	Part No.
1	Post, Binding	3	023833	15	Cover, End Motor	1	075119
2	Nut, Binding	6	023831	16	Machine Screw, Fillister Head, ¼"-20x.875"	8	2661-LSC
3	Washer, Beveled	15	023834				
4	Nut, Clamp	3	023832	17	End, Motor (Rear)	1	075118
5	Insulator, Lower	6	075123-1	18	Bracket, Assembly	1	075111-X
6	Insulator, Upper	3	075124-1	19	Brush, Motor Assembly	4	075116-X
7	Machine Screw, Fillister Head, ¼"-20x.875"	8	2661-LSC	20	Machine Screw, Round Head, #6-32x.500"	6	2559-RBN
8	Washer, Kant Link Lock, ¼"	1	1955	21	Washer, Cut, #6S	2	1704-B
9	Cap Screw, Hex Head, ⅜"-16x1"	8	4088-HSC	22	Machine Screw, Hex Head, #10-24x.25"	2	2589-HSC
10	Housing, Motor	1	075120	23	Washer, Shakeproof Lock, I. ⅜"	8	1860-ISC
11	Coil, Field Assembly	1	075178-X	24	Tape, Insulator	8	075133-1
12	Pole, Field Assembly	1	075108-X	25	End, Motor	1	070689-C
13	Bearing, Ball	2	075142	26	Armature, Assembly	1	070682-BX
14	Clamp, Bracket	1	075117	27	Spacer	1	070695-500

Terminal Board
Assembly and Replacement Parts

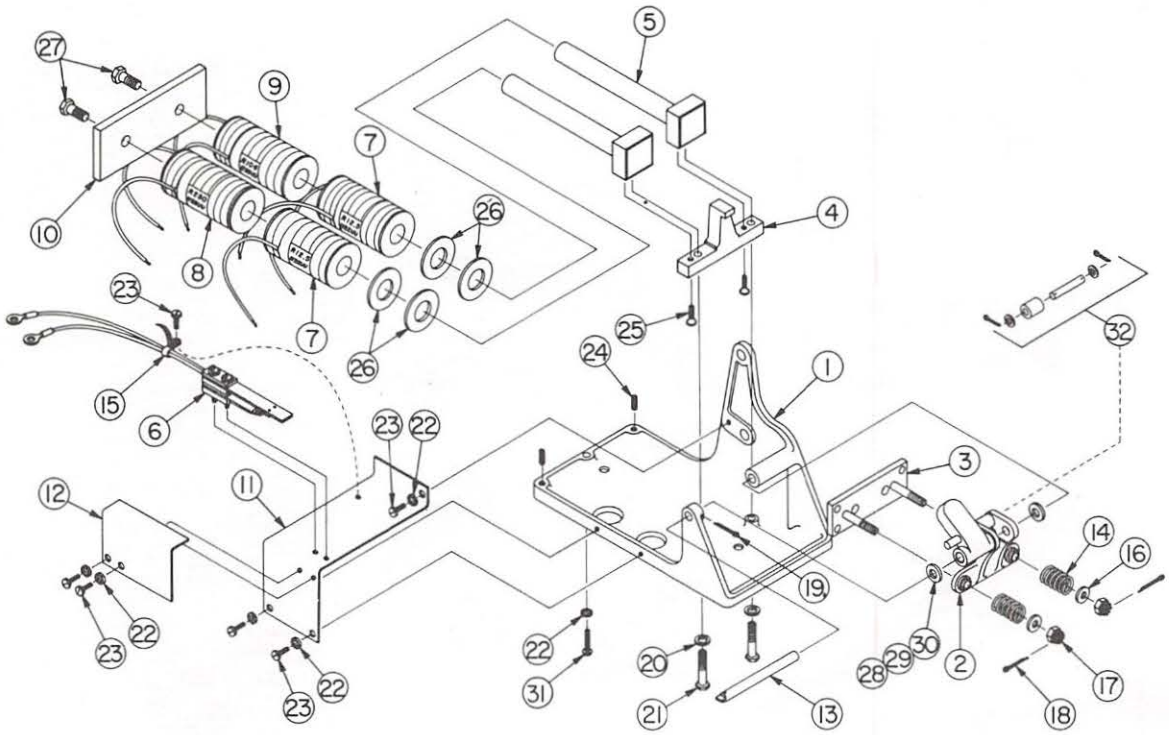


For Complete Assembly, Order Number 070625-6X.

To Order: Specify Description and Part Number.

Item No.	Description	Qty. Req.'d.	Part No.	Item No.	Description	Qty. Req.'d	Part No.
1	Post, Terminal	24	010427-6	8	Washer, Insulating	5	070627
2	Nut, Binding	48	023831	9	Spring, Reinforcing	5	070628
3	Nut, Clamp	24	023832	10	Contact, Fixed	5	070629-X
4	Connector	5	023839-2	11	Contact, Movable	5	070630-IX
5	Washer, Beveled	72	023834	12	Finger, Reinforcing	5	070632
6	Bushing, Insulating	5	041414	13	Eyelet, Test Assembly	1	024628-IX
7	Casting, Terminal Board	1	070625				

Hold Clear
Assembly and Replacement Parts

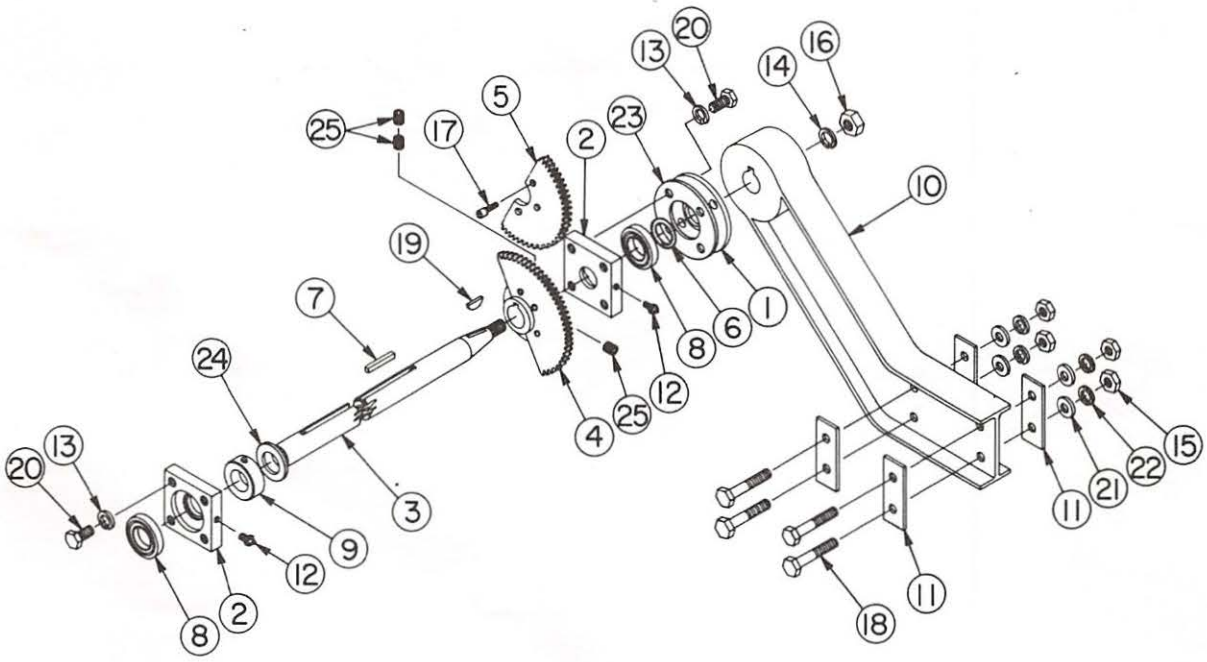


For Complete Assembly, Order Number 070780-AX.

To Order: Specify Description and Part Number.

Item No.	Description	Qty. Req.'d.	Part No.	Item No.	Description	Qty. Req.'d	Part No.
1	Frame, Hold Clear	1	070780-C	21	Cap Screw, Hex Head, 1/4"-28x1.25"	2	4026-HE
2	Bracket, Armature	1	070649-BX				
3	Armature Assembly	1	070647-X	22	Washer, Spring Lock, M, #10	6	1806-MSC
4	Stop, Hold Clear	1	070662-A				
5	Core, Hold Clear	2	070646-A	23	Machine Screw, Pan Head, #10-32x.375"	6	2614-PSC
6	Contact, Power Down	1	070777-2AYX				
7	Coil, Pick Up, (12.5 ohm)	2	070665-1X	24	Set Screw, Socket Head, #10-32x.5"	2	7852
8	Coil, Hold Clear (250 ohm)	1	070665-X				
9	Coil, Hold Clear, (106 ohm)	1	070665-3X	25	Machine Screw, Flat Head, #10-32x.5"	2	2616-FBN
10	Yoke, Hold Clear	1	070645-A				
11	Support, Contact	1	070770-A	26	Washer	4	040524-A
12	Plate, Cover	1	070770-1	27	Cap Screw, Hex Head, 5/16"-18x.75"	2	4044-HE
13	Pivot, Armature	1	070652				
14	Spring, Compression	2	070651	28	Washer, .063"	4	070653
15	Tie, Cable	1	18-04-002	29	Washer, .032"	4	070653-1
16	Washer, Shoulder	2	1980-F	30	Washer, .010"	4	070653-2
17	Nut, Castle, 1/4"-28	2	2494-SN	31	Machine Screw, Round Head, #10-32x.875"	1	2620-RBN
18	Pin, Cotter, 1/16"x.5"	2	1000-BN				
19	Pin, Cotter, 1/16"x.75"	1	1001-SC	32	Kit, Hold Clear Shaft and Roller	1	070665-5X
20	Washer, Spring Lock, M, 1/4"	2	1808-ME				

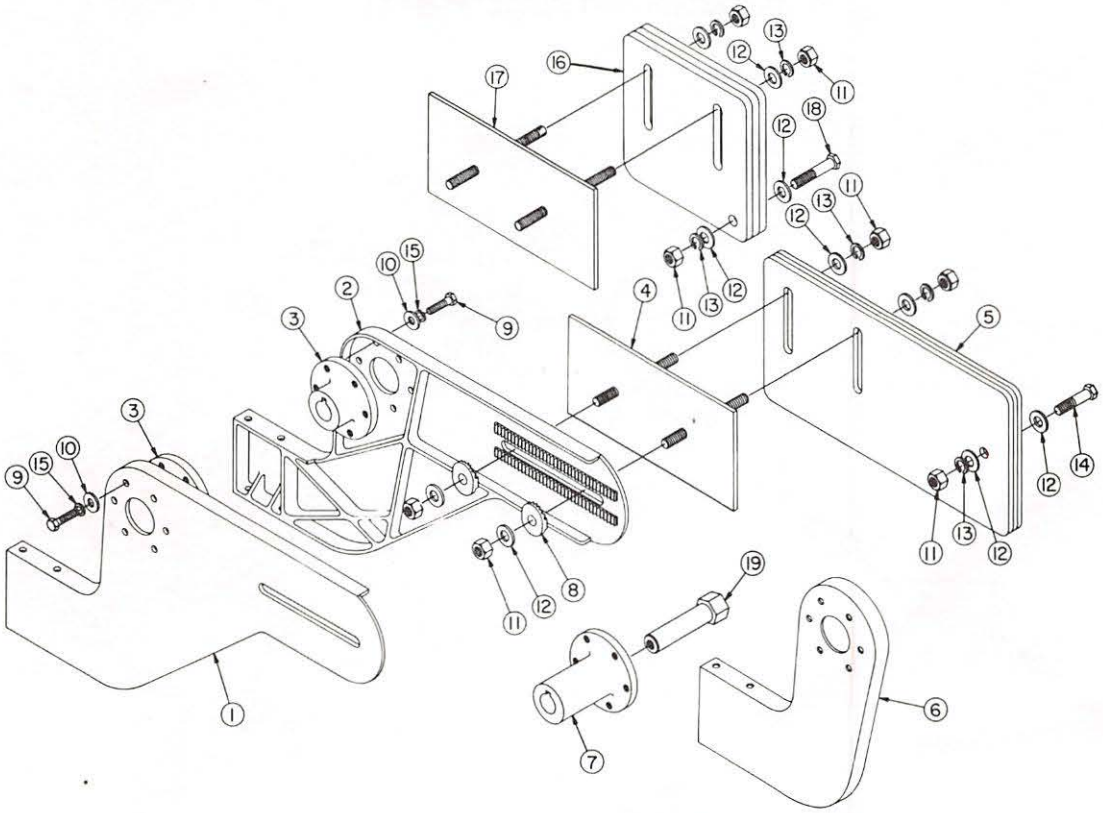
Auxiliary Shaft and Support for Sidewalk Arms Replacement Parts



To Order: Specify Description and Part Number.

Item Number	Description	Quantity Required	Part Number
1	Plate, Seal	1	070566-1
2	Housing, Bearing	2	070567
3	Shaft, Sidewalk Arm	1	070568
4	Gear, Sidewalk Arm	1	070569-AX
5	Gear, Top	1	070569-2
6	O-ring, 1¼"	1	070585-1
7	Key	1	070595
8	Bearing	2	070596
9	Collar, Set Screw	1	070597
10	Support, Sidewalk Arm	1	070759-X
11	Plate, Washer	4	070763
12	Fitting, Grease	2	110333-8A
13	Washer, Spring Lock, M, ½"	12	1812-MSC
14	Washer, Spring Lock, M, ⅝"	1	1814-MSC
15	Nut, Hex, ⅜"-16	4	2104-SC
16	Nut, Hex, ⅝"-18	1	2113-SC
17	Cap Screw, Socket Head, ⅜"-16x1.25"	3	4089-SSC
18	Cap Screw, Hex Head, ⅜"-16x2.75"	4	4095-HSC
19	Key, Woodruff,	1	7102
20	Cap Screw, Hex Head, ½"-20x1"	8	4185-HSC
21	Washer, Wrought, ⅜"	4	1753-C
22	Washer, Spring Lock, M, ⅜"	4	1810-MSC
23	Gasket	1	070747-2
24	Washer, Wrought, 1¼"	1	1762-C
25	Set Screw, Socket Head, ⅜"-16x.312"	3	4655-SC

Gate Arm Supports / Counterweights Replacement Parts



To Order: Specify Description and Part Number.

Item Number	Description	Part Number
1	Support, Left Hand Gate Arm	070920-L
2	Support, Right Hand Gate Arm	070920-R
3	Hub, Gate Arm Support	070923-3
4	Plate, Stud (for wood arms 13' - 36' and all fiberglass arms)	070757-26X
	Plate, Stud (for wood arms 37' - 42')	070757-24X
5	Counterweight, Steel, 1/2" x 15" x 30", 63 lbs.	070755-4
6	Support, Left Hand Gate Arm, for use without counterweights	070921-L
7	Hub, Extended (for sidewalk arms)	070575-1X
8	Ratchet, Counterweight Bolt	070924
9	Cap Screw, Hex Head, 1/2"-13 x 1.25"	4167-HSC
10	Washer, Wrought, 1/2"	1755-C
11	Nut, Hex, 3/4"-10	2114-SC
12	Washer, Wrought, 3/4"	1758-C
13	Washer, Spring Lock, M, 3/4"	1815-MSC
14	Cap Screw, Hex Head, 3/4"-10 x 2" (for 1 - 2 c'wts.)	4274-HSC
	Cap Screw, Hex Head, 3/4"-10 x 3" (for 3 - 4 c'wts.)	4278-HSC
	Cap Screw, Hex Head, 3/4"-10 x 4" (for 5 - 6 c'wts.)	4282-HSC
	Machine Bolt, Hex Head, 3/4"-10 x 6.5" (for 7 - 10 c'wts.)	3177-SC
15	Washer, Spring Lock, M, 1/2"	1812-MSC
16	Counterweight, Steel, 5/8" x 15" x 15"	070755-34
17	Plate, Stud (for wood arms to 36' and all fiberglass arms)	070757-30X
	Plate, Stud (for wood arms 37' - 46')	070757-31X
18	Cap Screw, Hex Head, 3/4"-10 x 2.5" (for 1 - 3 c'wts.)	4276-HSC
	Cap Screw, Hex Head, 3/4"-10 x 5" (for 3 - 7 c'wts.)	4284-HSC
	Machine Bolt, Hex Head, 3/4"-10 x 7.5" (for 8 - 10 c'wts.)	3179-SC
	Machine Bolt, Hex Head, 3/4"-10 x 14" (for 11 - 20 c'wts.)	3190-SC
19	Nut, Extended (for sidewalk arms)	070579

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